

DELCO'S SMART IMS For 39MT Starters and More



BY BOB THOMAS

It has been nearly two years since Delco Remy announced their new Smart IMS (intermediate magnetic switch) for 39MT starters. At that time it was only available as an option on new starters in both 12 and 24 volt versions. The part numbers of those starters are 61003201 and 61003202 respectively.

This past spring they announced that it would soon be available as a kit, which could be easily installed on any 39 MT, as well as 29, 37, 40, 41 or 42MT starters. Demand has outpaced supply since the release of the kit. We had to wait three months to get one on back-order. The cost was about \$30 more than the original 39MT IMS.

The Smart IMS was designed to eliminate warranty claims from damage caused by conditions outside the starter. Issues like operator errors, low or defective batteries and faulty cables were taken into consideration. The goal was to cover over-cranking, cranking on low voltage, engaging the starter while the engine is running, engaging the starter too quickly after a failed attempt (causing kick-back) or holding the starter switch on, when the solenoid's contacts do not close (click-no-crank). The Smart IMS addresses all of those issues.

When compared to an original 39MT relay (see Figure 1), it is not hard to tell them apart. The plastic cap is considerably larger to house the control circuit. Notice that the positive battery wire terminal is considerably heavier (both thicker and wider) than those on the original IMS (see Figures 2 and 3). Given the high amperage draw of a 39MT pull-in coil (230 amps), that was a needed improvement. Aside from physical size, the Smart IMS has an extra wire to monitor voltage on the the starter's motor terminal. It is permanently attached to the back side of new switch (see Figure 4).



Figure 1 – Delco's new Smart IMS (right) next their original IMS (left).



Figure 2 – Front view comparison of their B+ wire end terminals, Smart IMS (right) and original IMS (left).

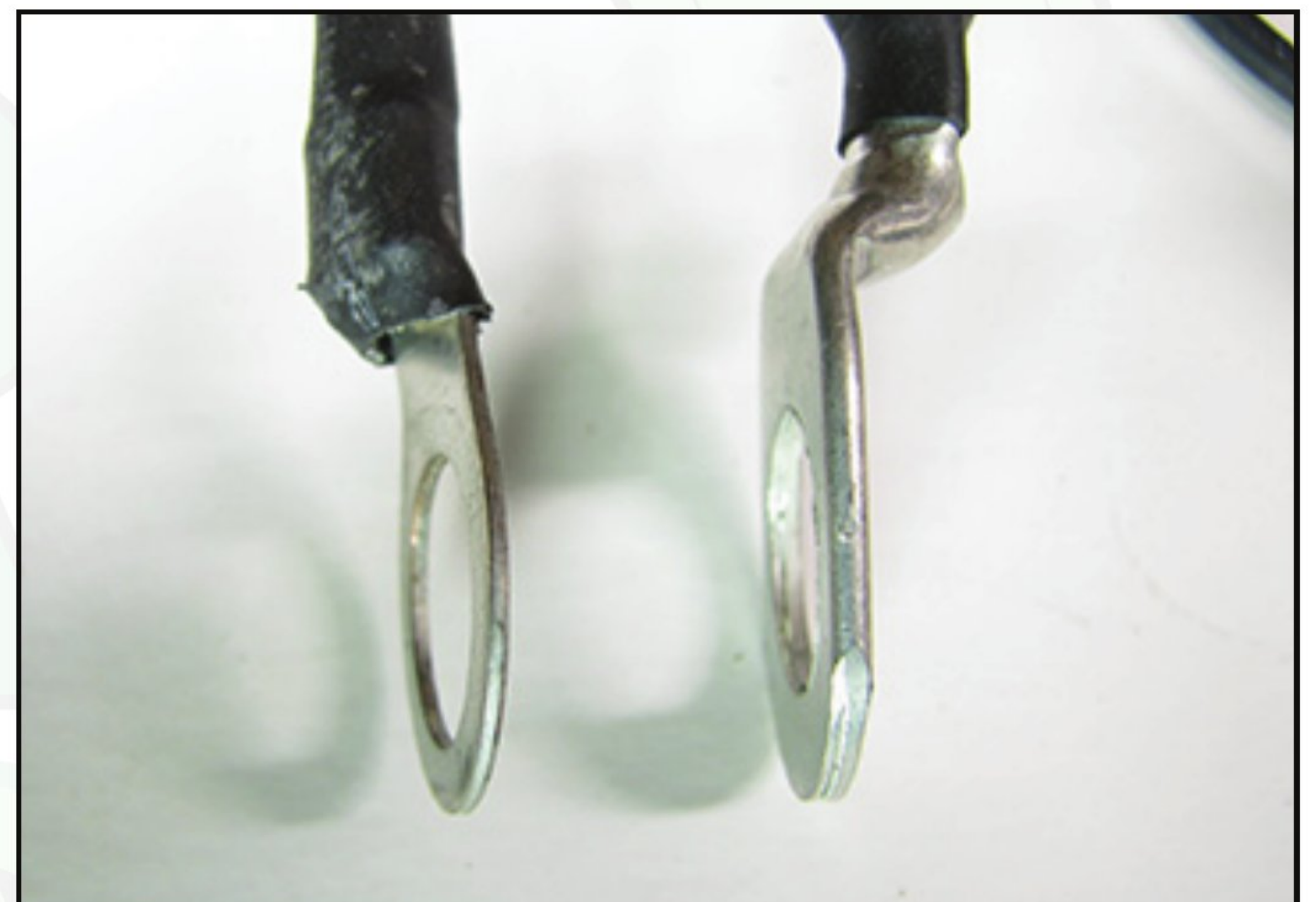


Figure 3 – Side view of the B+ wire terminals, Smart IMS (right) and original IMS (left).



Figure 4 – Smart IMS with motor terminal connection.

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The Smart IMS comes with the B+ and solenoid switch wires attached, making it impossible to get them confused during installation. However, if you happen to remove them for some reason, Delco has covered that base too. The top of the B+ stud on the relay is painted red (see Figure 5).

The Smart IMS lacks the ground terminal that its predecessor had, meaning that the new IMS is **case ground-ed**. Delco Remy supplies a jumper wire in the kit to ground the metal base of the IMS to the ground terminal on the solenoid when it is installed on engines that are not already grounded (see Figure 5). However, in that case you are essentially grounding an isolated ground engine block with a 10 gauge wire that theoretically would only be used by the control relay.

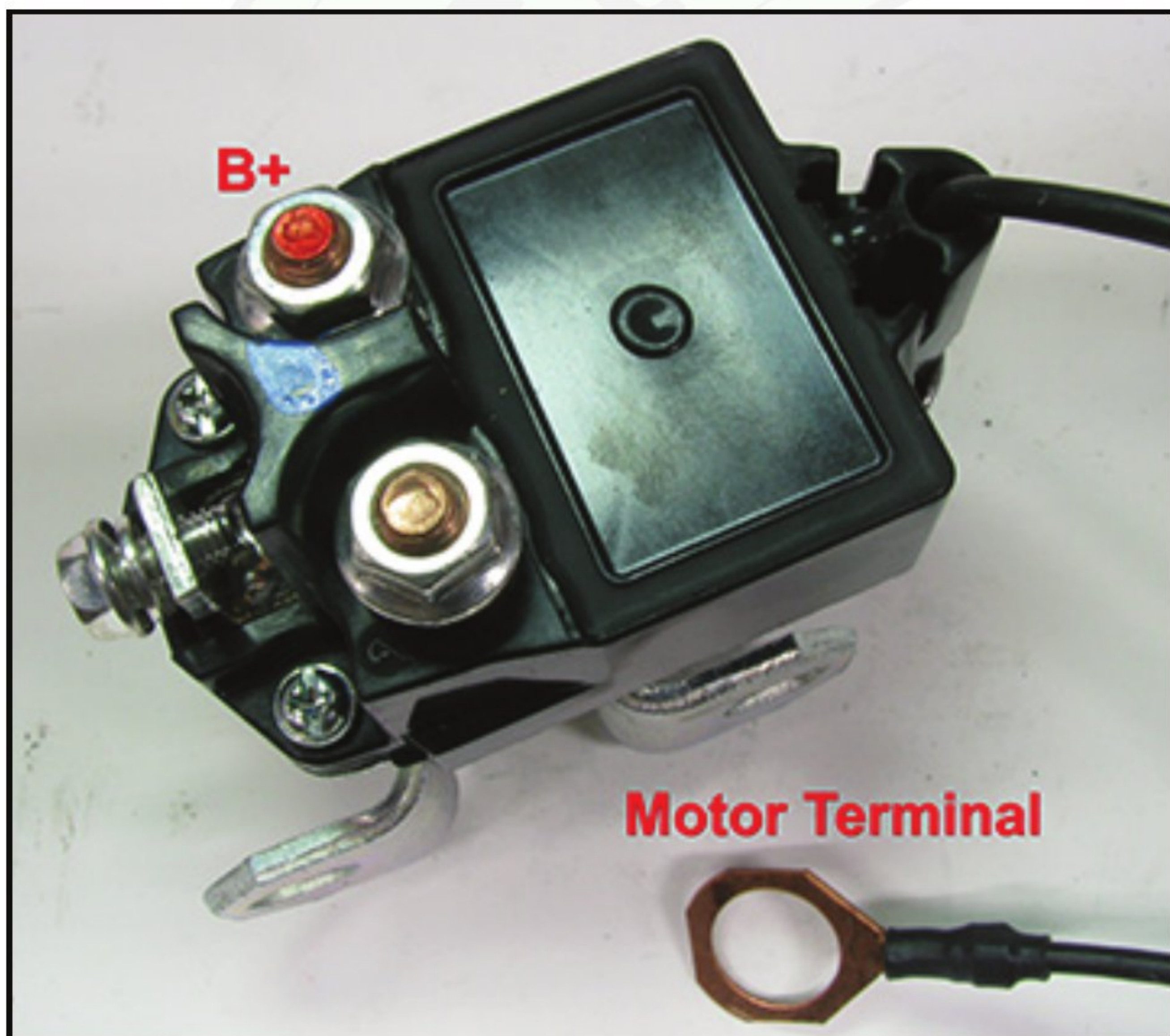


Figure 5 – Top view of Smart IMS showing color coded B+ terminal.

Both the 39MT starter and its solenoid are isolated ground, yet the Smart IMS is not. Granted, isolated ground applications are few and far between in today's market, but they do exist. That is my personal opinion and only complaint of this truly innovative control relay.

The heart of the Smart IMS is its small programmable circuit board (see Figure 6) which has total control of the switch. The term "programmable circuit board" comes straight from Delco's website, but by no means does it imply that the IMS circuit board can be re-programmed at any time once it has been sealed inside. I had to cut the cover away to get that photo and can attest that it is inaccessible and well-sealed from any contaminants.

How It Works

When voltage is applied to its switch terminal, it signals the PCB to engage the starter. Within a few milliseconds, it checks open circuit battery voltage to insure that it is above 11.75 volts and below 13.75 volts. If it is within those parameters, it activates the relay by powering the coil. This feature inhibits cranking on a low battery or accidentally engaging the starter while the engine is already running.

If at any time, the voltage applied to the IMS's switch



Figure 6 – Smart IMS ground wire connected to the solenoid's ground.

terminal drops below 8 volts, it will not engage at all or disengage if already cranking. That prevents attempted cranking or continued cranking on excessively low voltage.

By monitoring voltage on the solenoid's motor terminal, the PCB can determine the exact instant that the engine starts. It will then deactivate the IMS, a full second or more before the operator has time to release the switch. This feature protects the drive's clutch from being over-run by an operator holding the key on start for too long.

In the event of a click-no-crank, the control board deactivates the relay and automatically re-tries the start on its own. This prevents the operator from holding the switch in the start position in such instances, which will quickly overheat the starter solenoid's pull-in coil. Remember that 10 volts times 230 amps equals 2300 watts, ten times what most soldering guns draw. Any reader who has seen more than a few 39MT cores has encountered a solenoid with the switch terminal connection to the solenoid's coils completely desoldered.

The control circuit also limits cranking to 20 seconds and enforces a 10 second delay before any additional cranking. There is also a three-second delay after each start attempt, to prevent re-cranking an engine that is rolling back off of a compression stroke, saving the starter from kick-back damage.

These features will prevent most 39MT starter failures caused by accidental abuse. While they may cause some operator complaints, they should virtually eliminate denied warranty claims that can upset both you and your customer. But you must educate each customer to expect the Smart IMS's unique characteristics. They will likely appreciate the protection that the Smart IMS provides and be less likely to

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complain later about a feature designed to prevent them or an employee from damaging the starter unintentionally.

Installing a Smart IMS is relatively simple if you follow the instructions that Delco provides. However, I would not trust an end user with the installation, unless you are confident that they understand the terminology used in the instructions. A single improper connection could damage the PCB and the 1/2" motor terminal could fit on other studs.

Testing an installed starter equipped with the Smart IMS is similar to testing any other starter. But the person doing the testing must be aware of the voltage limits required for the IMS to operate. Open circuit voltage and voltage drop readings are essential. For instance, if a battery bank is connected to a charger on boost, the open circuit voltage could very well exceed 13.75 volts. The PCB would read that as engine running and would not engage the starter.

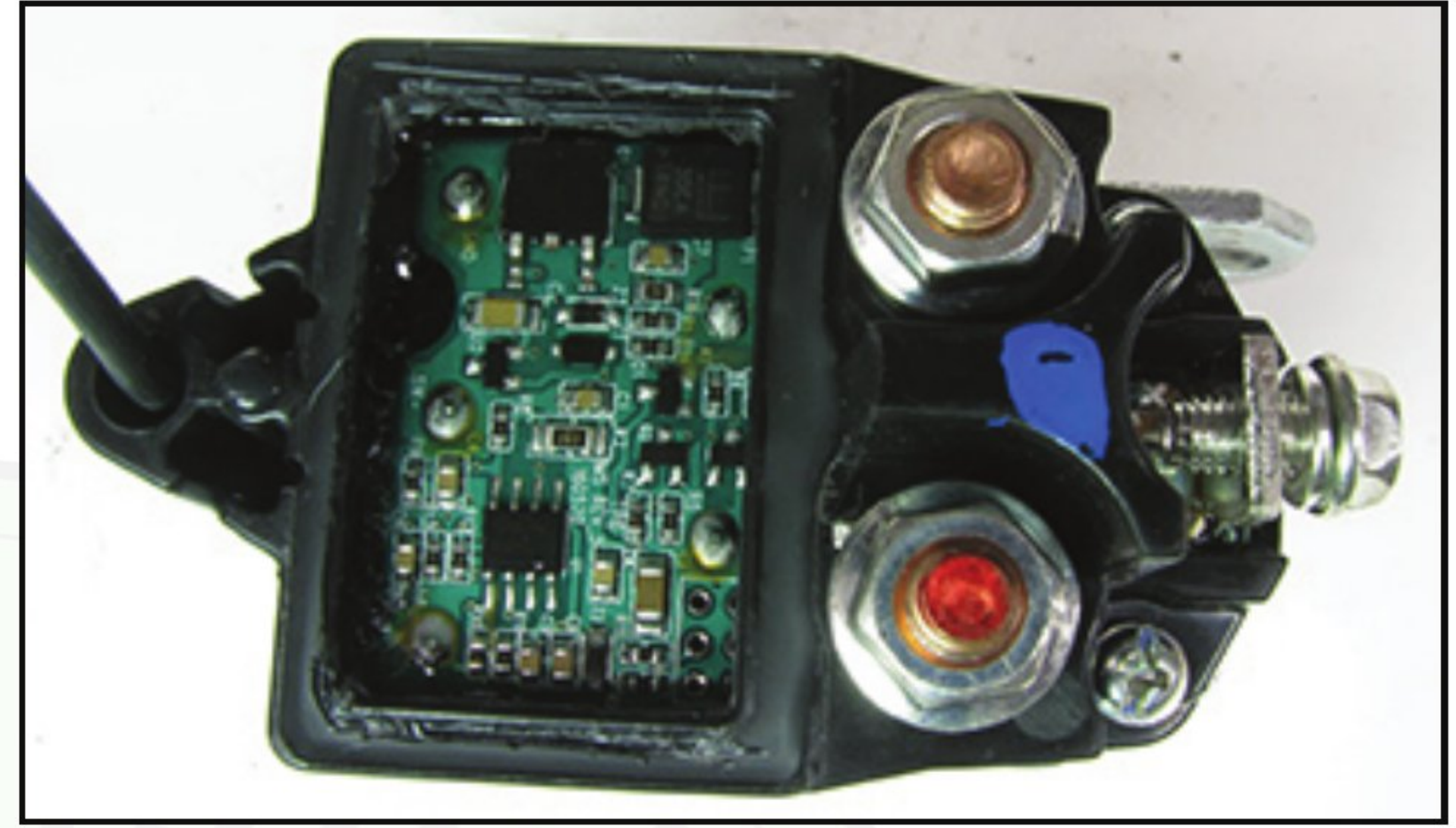


Figure 7 – View of the Smart IMS circuit board that has complete control of the switch.